

# Low emissions of modern diesel vehicles

FBP-BPF conference • Brussels • 12 December 2019

# Association for Emissions Control by Catalyst (AECC AISBL)

AECC members : European Emissions Control companies



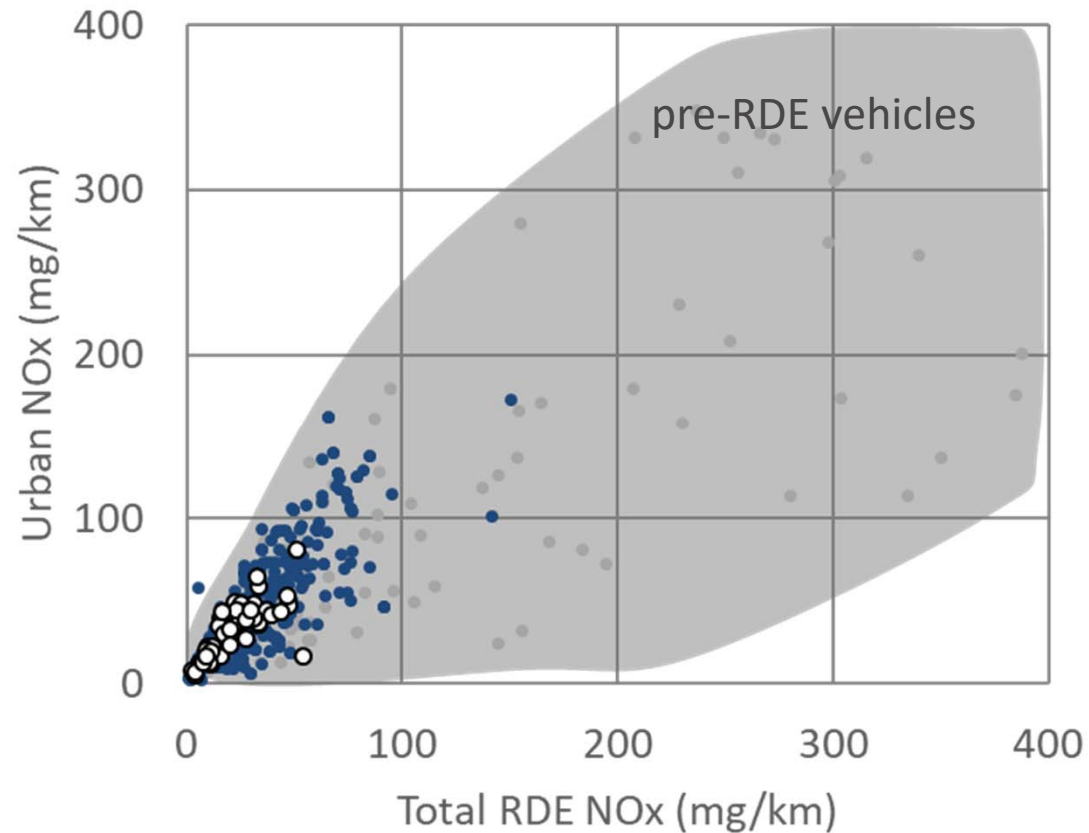
- Exhaust emissions control technologies for original equipment, retrofit and aftermarket for all new cars, commercial vehicles, motorcycles, and non-road mobile machinery
- AECC is # 78711786419-61 in EU Transparency Register and has consultative status with the UN Economic and Social Council (ECOSOC)

# Content

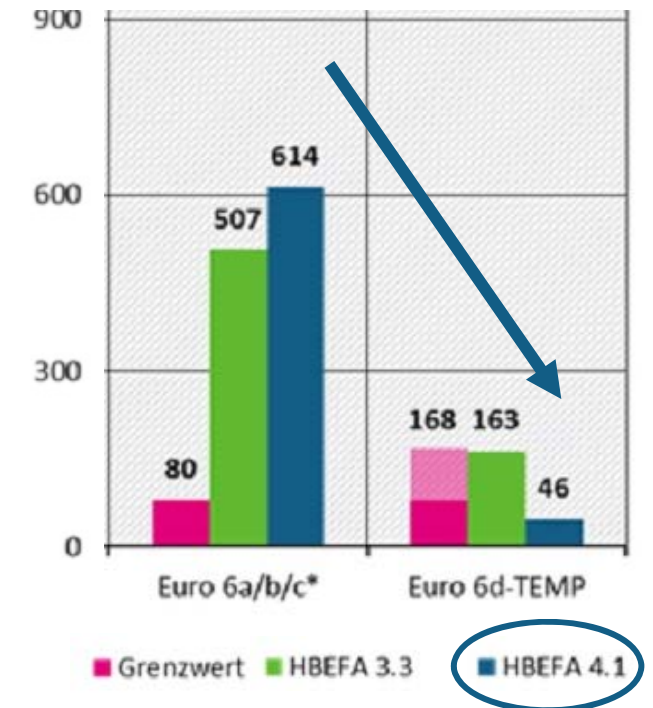
- Low NOx emission diesel cars: a reality
- AECC ultra-low emissions diesel demonstrator
  - Concept
  - NOx emissions
  - Real-time visualisation

# RDE has significantly improved diesel NOx emissions

- On-road emissions of Euro 6d-TEMP and 6d cars are well within standards



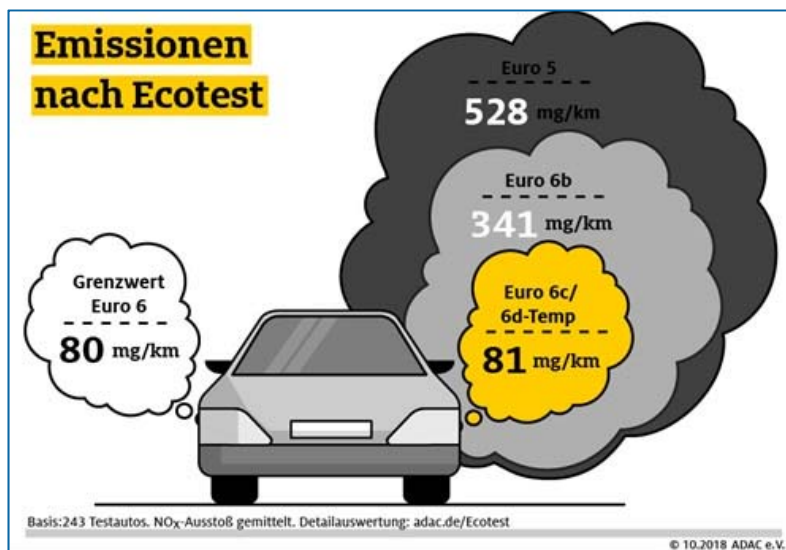
Source: ACEA/JAMA PEMS  
data consulted  
19 November 2019



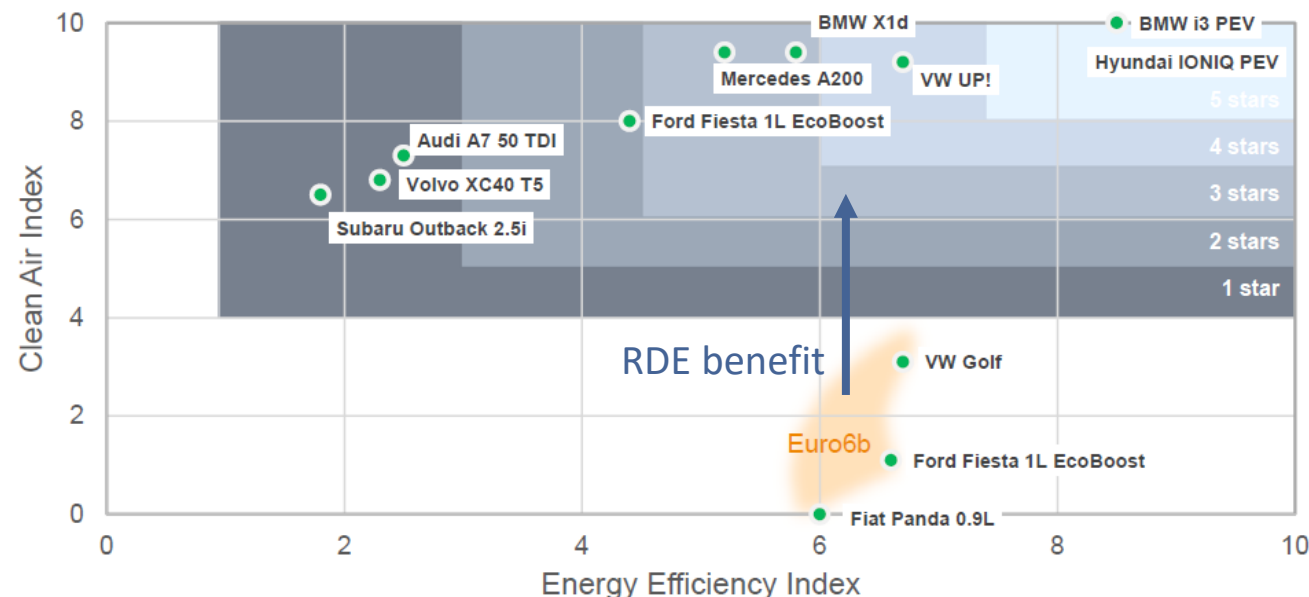
Source: Handbook of Emissions Factors 4.1,  
UBA press release 11 September 2019

# RDE has significantly improved diesel NOx emissions

➤ Trend is confirmed by 3<sup>rd</sup> party testing



Source: ADAC Ecotest



Source: Green NCAP

## DIESEL NO<sub>x</sub> AVERAGES (G/KM)



- EURO 5  
0.814
- EURO 6 PRE-RDE  
0.334
- EURO 6 POST-RDE  
0.048



Source: Emissions Analytics

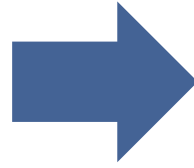
**Diesel und Benziner:  
Jetzt sind beide sauber!**



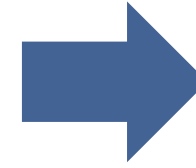
Source: Auto Motor und Sport

# Light-duty diesel emissions control technology evolution

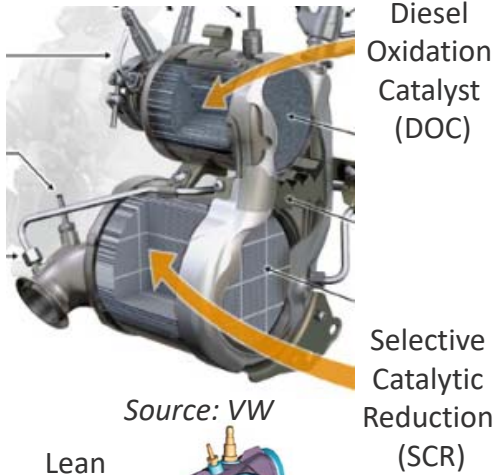
Introduction of individual deNOx technologies for Euro 6a/b



Combination of deNOx technologies for Euro 6d-TEMP



Further integration for Euro 6d



Source: VW

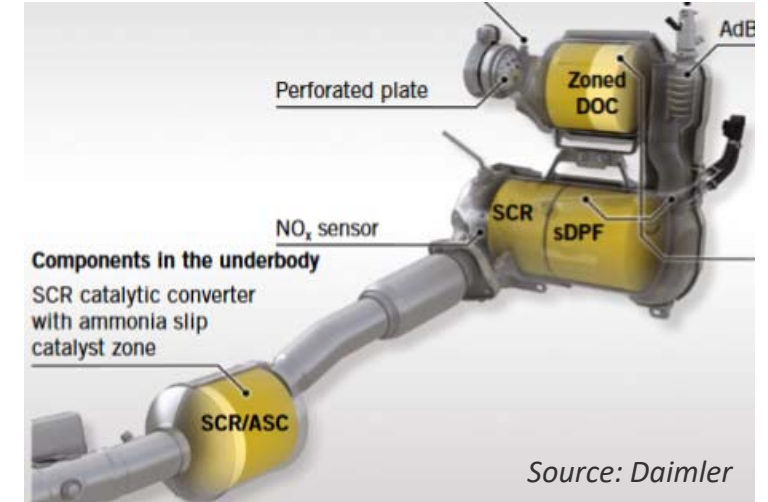
Lean NOx Trap (LNT)

Diesel Particulate Filter (DPF)

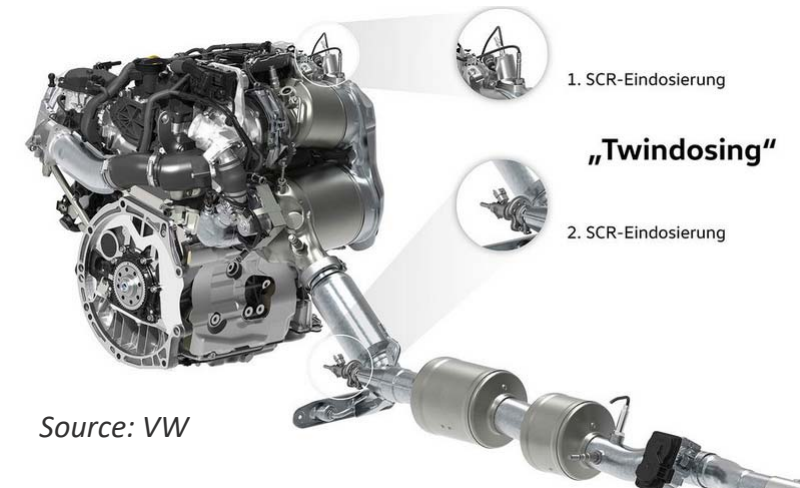
Source: BMW



Source: Hyundai



Source: Daimler



Source: VW



# Content

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# AECC ultra-low NOx emissions diesel demonstrator

➤ Robust NOx control over wide range of driving conditions

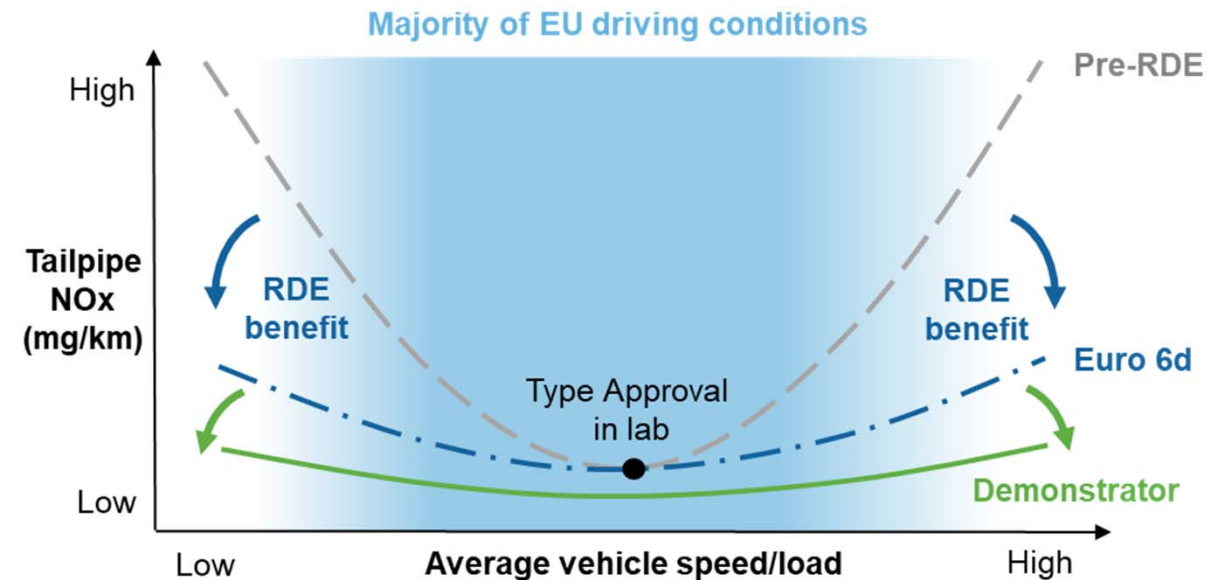
➤ Low speed/load  
e.g. city driving



➤ High speed/load  
e.g. motorway driving



➤ Transients  
e.g. overtaking

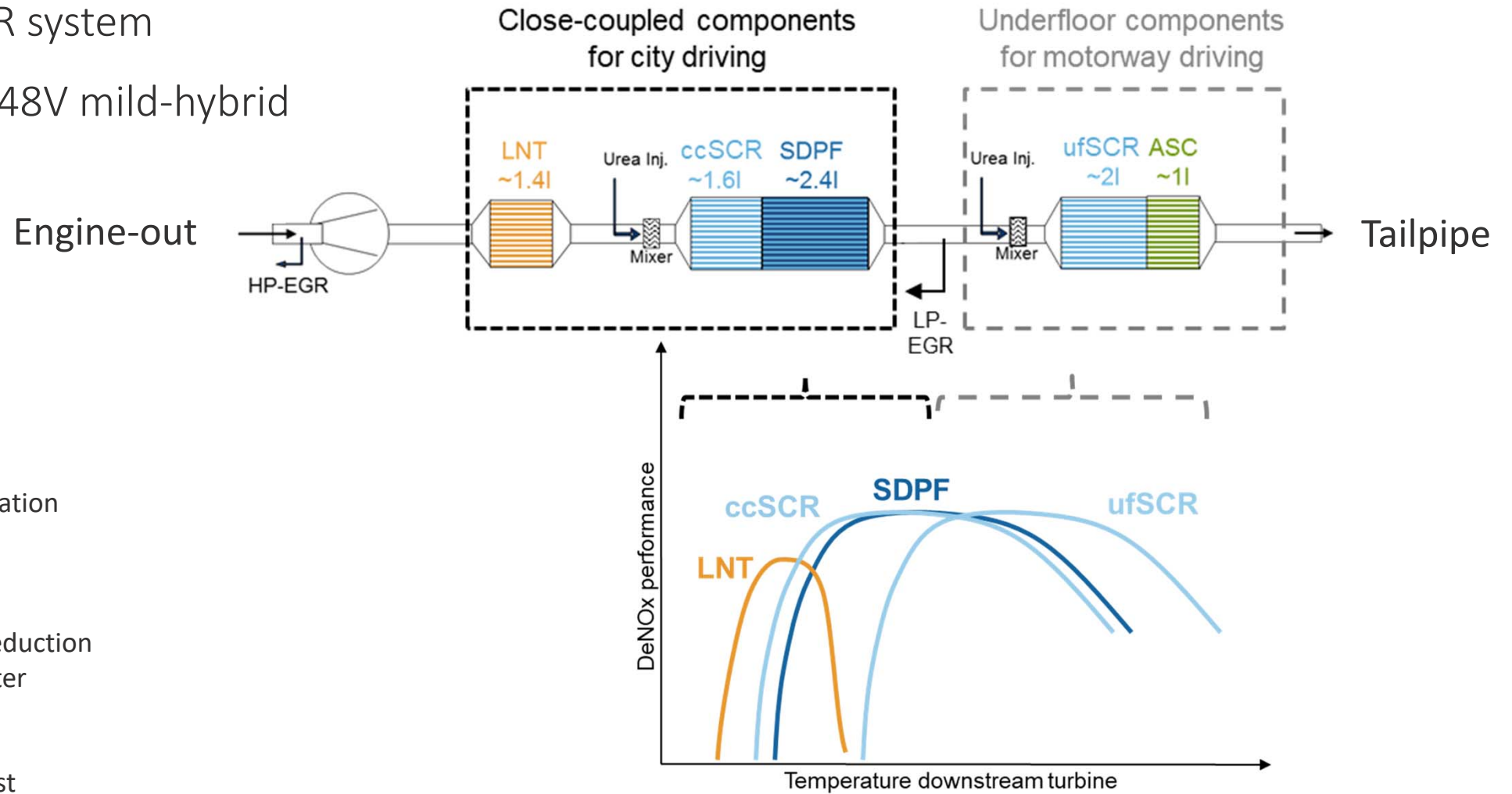


More details: J. Demuynck, et al.; "Integrated Diesel System Achieving Ultra-Low Urban and Motorway NOx Emissions on the Road", 40th International Vienna Motor Symposium, 2019  
<https://www.aecc.eu/wp-content/uploads/2019/04/190516-AECC-IAV-IPA-Integrated-Diesel-System-achieving-Ultra-Low-NOx-on-the-road-Vienna-Symposium.pdf>



# Emissions controls to cover wide range of driving conditions

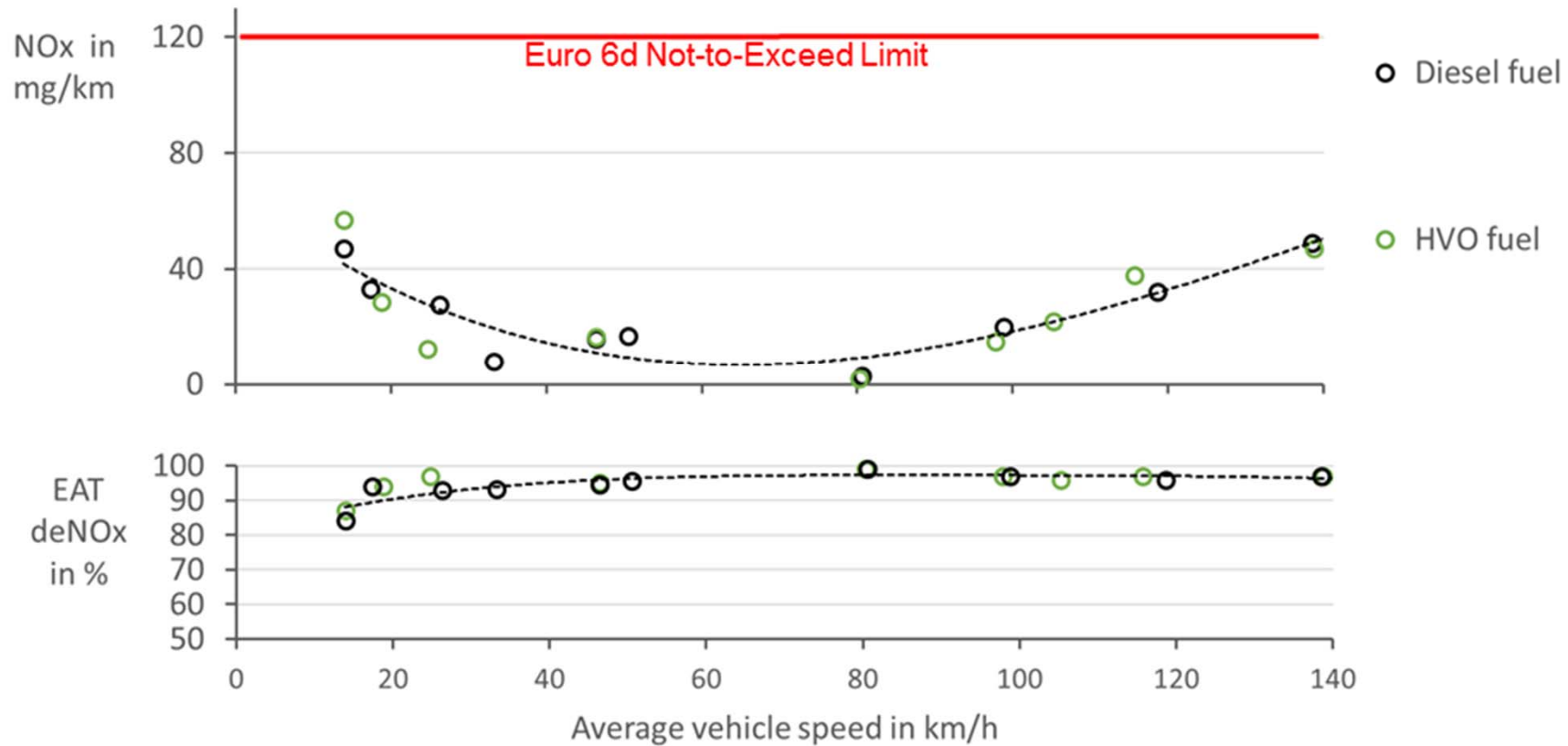
- LNT + dual-SCR system
- Supported by 48V mild-hybrid



EGR: Exhaust Gas Recirculation  
HP/LP: High/Low pressure  
cc: close-coupled  
LNT: Lean NOx trap  
SCR: Selective Catalytic Reduction  
DPF: Diesel Particulate Filter  
SDPF: SCR on DPF  
uf: underfloor  
ASC: Ammonia Slip Catalyst

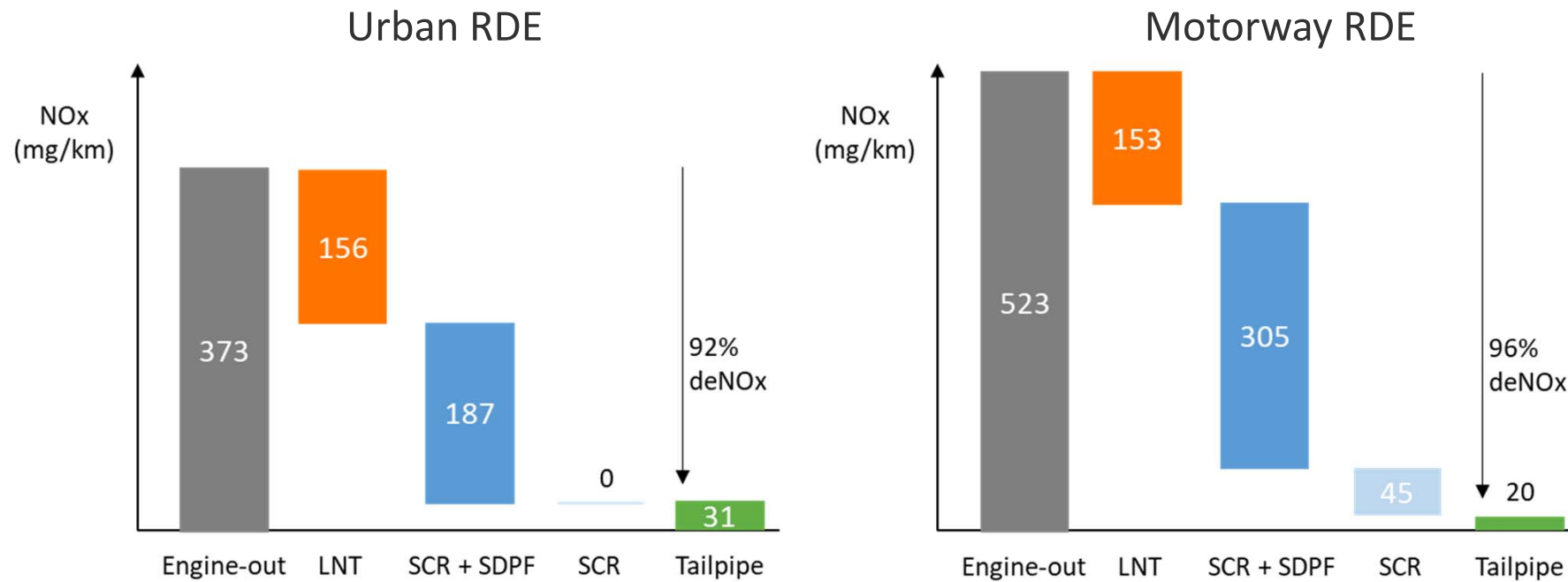
# Robust NOx control achieved

- Also on a renewable fuel which offers reduced CO<sub>2</sub> emissions on lifecycle basis



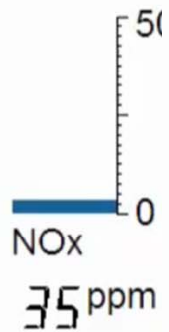
# All aftertreatment components contribute to NOx control

- City driving: LNT and close coupled SCR+SDPF
- Motorway driving: underfloor SCR required to secure robust emissions control



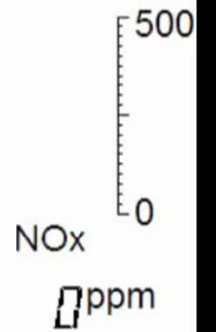


Engine load: 11%    Vehicle speed: 0 km/h



More videos available on YouTube (AECC eu):

[https://www.youtube.com/channel/UCbPS9op5ztLqrv6zlMH\\_IcQ](https://www.youtube.com/channel/UCbPS9op5ztLqrv6zlMH_IcQ)



Engine  
heat-up

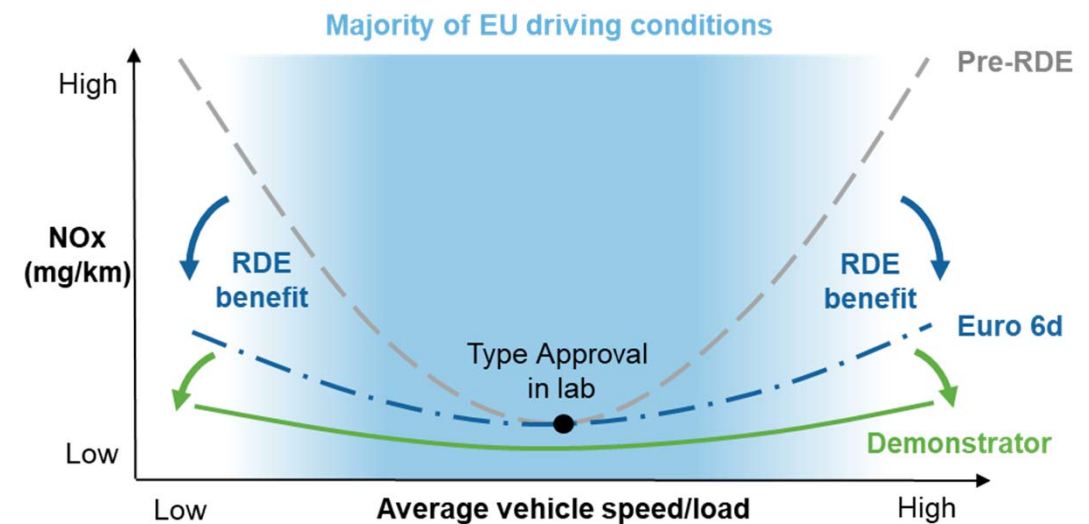
LNT  
regeneration

Urea  
doser 1

Urea  
doser 2

# Conclusions

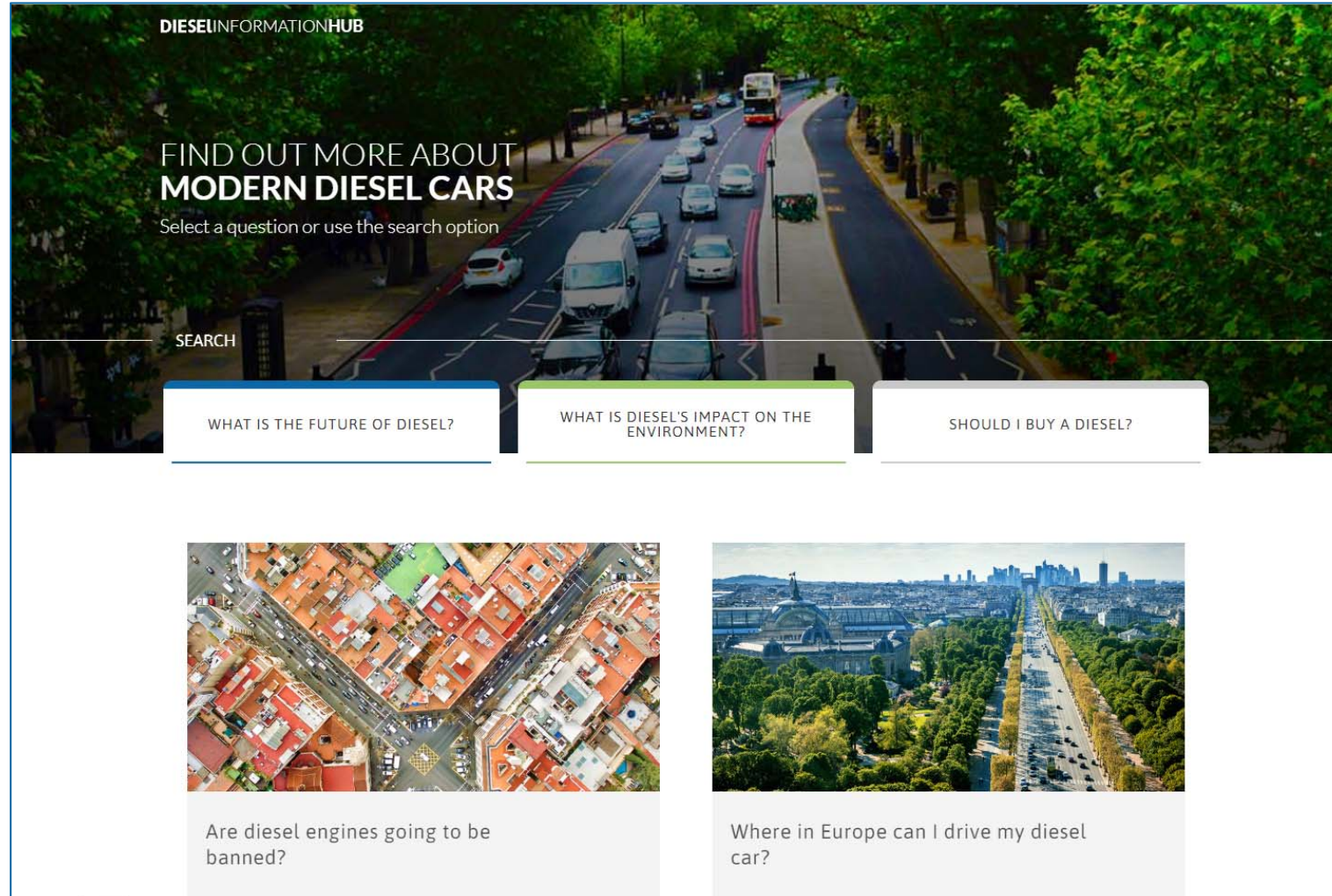
- RDE requirements have ensured better control of NOx & PN emissions under most EU driving conditions – these Euro 6d(-TEMP) cars are on the road today
- AECC's diesel demo car shows that diesel NOx emissions can be kept at a very low level, over a wide range of driving conditions
- This is achieved by combining existing catalyst technologies with improved engine and aftertreatment control functions supported by hybrid technology.





# Diesel Information Hub

<https://dieselinformation.aecc.eu>



The screenshot shows the Diesel Information Hub website. At the top, the text "DIESELINFORMATIONHUB" is visible. Below it, the main heading reads "FIND OUT MORE ABOUT MODERN DIESEL CARS" with a subtext "Select a question or use the search option". A search bar with the label "SEARCH" is present. Below the search bar are three buttons: "WHAT IS THE FUTURE OF DIESEL?", "WHAT IS DIESEL'S IMPACT ON THE ENVIRONMENT?", and "SHOULD I BUY A DIESEL?". At the bottom, there are two more buttons: "Are diesel engines going to be banned?" (accompanied by an aerial view of a city street) and "Where in Europe can I drive my diesel car?" (accompanied by a view of a city street with a large building in the background).

# THANK YOU !

[www.aecc.eu](http://www.aecc.eu)

[dieselinformation.aecc.eu](http://dieselinformation.aecc.eu)



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AECC (Association for Emissions Control by Catalyst)



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